

The Stem Sawflies of Florida (Hymenoptera:Cephididae)¹

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INTRODUCTION: The Cephidae are called stem sawflies because of the habits of the larvae which bore and feed in berry canes, stems or twigs of various shrubs, or in grass stems. The North American species all belong to the subfamily Cephinae which contains two tribes, Cephini and Hartigiini (Ries 1937). Species of the tribe Cephini can be serious pests of grains. There are three species of Cephini of European origin in the eastern United States: the wheat stem sawfly, *Cephus cinctus* Norton; the European wheat stem sawfly, *Cephus pygmaeus* (Linnaeus); and the black grain stem sawfly, *Trachelus tabidus* (Fabricius). These European species are not yet in Florida, but some species, such as the wheat stem sawfly, are actively dispersing. The wheat stem sawfly dispersed into northern Georgia about 1990. Apparently there is a critical time period when grasses or grains can be attacked and it is hypothesized that no economic species of grasses will be affected in the eastern United States since they are not suitable during the period of oviposition.

The Florida species of Cephidae all belong to the tribe Hartigiini. The only recorded species in Florida is *Hartigia trimaculata* (Say), a pest of blackberries and roses (Smith 1986). Two additional species are newly recorded here for Florida. These are *Janus abbreviatus* (Say), the willow shoot sawfly (first collected in 1977), and *Janus integer* (Norton), the currant stem girdler (first collected in 1995). None of the Florida species occurs in large enough numbers to cause any significant economic damage, but outbreaks of any one of these species could occur in the future.

The family Cephidae is easy to identify since it is morphologically intermediate between the Hymenoptera suborders Symphyta and Aculeata. The first abdominal segment is not fused with the thorax in Cephidae distinguishing them from the Aculeata which have the first abdominal segment incorporated into the thorax as the propodeum. The cephids lack the metanotal cencri (pair of hard, opaque, rough areas) found in all other families of Symphyta. The Florida members of this family range in size from about 8 to 20 mm and have the bodies laterally compressed (Figs. 1-3).



Fig. 1. Female *Janus abbreviatus* (Say)

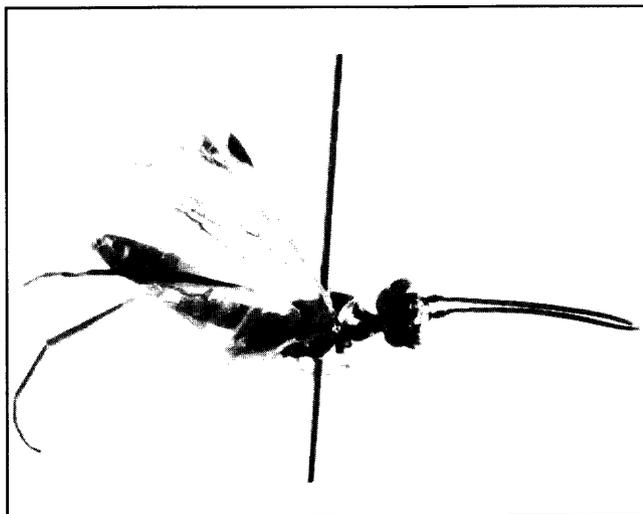


Fig. 2. Male *Janus Integer* (Norton)

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BIOLOGY: Adults are slow flying insects usually found visiting flowers of the host. In Florida, adults of *H. trimaculata* are found in the spring (February to June) visiting blackberry flowers. Champlain (1924) made some biological observations on *Hartigia* in Pennsylvania. He found females flying around rose bushes, alighting from time to time head downwards on the terminals of the new shoots. Moving down the terminals head first, the female used the tip of the abdomen and sometimes the ovipositor as a tactile organ, inserting the latter at short intervals into the tissues of the new growth. Considerable damage was done by the female in puncturing the buds and terminals. Apparently only the first larva to hatch survives in a single terminal, as never more than a single larva was found in each tunnel. The larva begins feeding on the terminal, which wilts and dies, and then starts feeding on the pith, packing excrement in the tunnel behind it as it moves down the stem. The length of the tunnel varies with the length of the shoot and also with the elapsed time since the egg hatched. At certain intervals the larva girdles the inside of the stem above the spot where it is feeding, frequently causing the stem to break or at least wilt and die above that point. When fully grown, it makes a partial opening in the stem to the outside, spins a cocoon, and overwinters in that portion of the tunnel where it last fed. Pupation occurs in early spring. Smith (1986) provides collection records on raspberry (*Rubus idaeus*), boysenberries (*Rubus ursinus* var. *loganobaccus* cv. "Boysen"), blackberry (*Rubus sp.*), rose (reared), on *Rudbeckia*, and on asparagus (*Asparagus officinalis*). The latter two records probably do not indicate the true host (Smith 1986).

Slingerland (1897) and Britton (1921) provided some information on *J. integer*. The females emerge in May or June in the northeastern United States (April in Florida) and the female deposits her eggs in the pith of currant stems 5 cm or more below the tips. The female then girdles the stem 1.5 to 2.5 cm above the puncture with her ovipositor. The stem is usually not severed, but subsequently wilts and breaks off above the cut, leaving a stub. The eggs hatch in about eleven days. A single young larva tunnels downward in the pith of each stem and continues feeding in the pith throughout the growing season. The tunnels, packed with frass, rarely extend more than 15-18 cm down the stem. In early September, the larva forms a cell about 2 cm from the lower end of the tunnel, cuts through the wood to the epidermis, and spins a silken cocoon in which it passes the winter. Pupation occurs in early spring and lasts about two weeks. There is but one generation per year. The host of this species in Florida is questionable. There is only one species of *Ribes* in Florida, *Ribes echinellum* (Cov.) Rehd., known only from Jefferson County. It may be that *J. integer* bores into the stems of other Saxifragaceae such as *Philadelphus inodorus* L. (mock orange) or *Itea virginica* L. (Virginia sweetspire). The other species of *Janus* in Florida, *J. abbreviatus* (Say), has been found to bore into the twigs of willows (*Salix*) and poplars (*Populus*) in other areas and is a pest in nurseries (Solomon and Randall 1978). All the captures of *Janus* in Florida have been in flight intercept traps in April and May.

SURVEY AND DETECTION: Adults fly in the spring and, at least in the case of *H. trimaculata*, visit blackberry flowers. In the case of rose bushes, ovipositor puncture wounds on the buds and terminals can be detected by close examination. Later, the stem will wilt and occasionally break. Inspection of the tunnel may reveal the larva which is pinkish white, cylindrical, with the thorax slightly enlarged. It measures about 21 mm when mature (Middleton 1917). The larva has 4-segmented antennae and the thorax has three pairs of small, unsclerotized, fleshy legs. The prothorax is distinctly sclerotized and the abdomen has three annulate segments and no prolegs. The host of *J. integer* is unknown in Florida, but damage to plants related to *Ribes* (i.e., *Philadelphus inodorus*; *Itea virginica*) should be considered as possible candidates of stem sawfly damage. Nursery inspection of willows (*Salix sp.*) should be directed to the terminals of the branches which would have a series of punctures made by the saw-like ovipositor of the female. Older branches can be broken off and the hollows examined for larvae. Cottonwood (*Populus sp.*) terminals are occasionally killed, but most attacks are confined to small lateral shoots, causing minimal damage.

CONTROL: Infestations can be reduced in small nurseries by pruning and destroying infested shoots. Also, good sanitation practices such as the collecting and destroying all broken, pruned and discarded twigs and shoots should reduce infestations. There are a number of parasitic Hymenoptera that attack Cephidae according to Solomon & Randall (1978) who studied the parasite complex of *J. abbreviatus*. Recorded species belong to the families Braconidae (*Bracon jani*; *Microbracon sp.*), Eulophidae (*Tetrastichus sp.*), Eupelmidae (*Eupelmus sp.*), Eurytomidae (*Eurytoma sp.*), and Ichneumonidae (*Scambus spp.*).

Key to the Stem Sawflies of Florida and Threatening Exotic Stem Sawflies (Adapted from Middlekauff 1969 and Smith 1989)

1. Antenna with segment 3 shorter than 4, flagellum constricted at base for about one half of its length; hind basitarsus not as long as the 3 following tarsomeres together; associated with grasses (Cephini) (wheat sawflies, not yet in Florida) 2
- 1'. Antenna with segment 3 longer than 4, flagellum constricted at base for only one-fourth of its length; hind basitarsus longer than next 3 following tarsomeres together; associated with Rosaceae (Hartigiini) 4
2. Abdomen black with longitudinal yellow lateral lines; saw sheath of female ovipositor broadening slightly toward apex, where it is broader than apex of tibia; male with deep setiferous pit on sternites VII and VIII *Trachelus tabidus* (Fabricius)
- 2'. Abdomen black with transverse yellow bands; saw sheath of female ovipositor tapering evenly behind, where it is narrower than apex of tibia; male without deep pits on sternite VII and VIII 3
3. Stigma and costa uniformly dark brown; femora, apical abdominal tergite, and venter entirely black *Cephus pygmaeus* (L.)
- 3'. Stigma and costa yellow; femora, apical abdominal tergite, and usually the venter, in part yellow *Cephus cinctus* Norton
4. Wings completely dark infuscated (Fig. 3); hind tibia with 1 pre-apical spine; pretarsal claws without basal lobe; maxillary palpus shorter than front tibia; larvae bore in blackberries and roses *Hartigia trimaculata* (Say)
- 4'. Wings nearly completely hyaline (Figs. 1, 2); hind tibia with 2 pre-apical spines; pretarsal claws with an acute basal lobe; maxillary palpus longer than front tibia; larvae bore in currants, *Ribes* spp. or willows and poplars. . . . 5
5. Forewing completely hyaline, with base of radial vein usually atrophied near stigma (Fig. 1) *Janus abbreviatus* (Say)
- 5'. Forewing with conspicuous fuscous spot below stigma, radial vein completely developed (Fig. 2) *Janus integer* (Norton)

List of Florida Species (specimens in FSCA)

1. *Janus abbreviatus* (Say, 1824)

DISTRIBUTION: Eastern United States and Canada west to Manitoba, Minnesota, and south to Virginia (Florida).
Florida Records: **Alachua County**: Fairbanks, 11-30.III.1977, J. Butler (1 ♀); 9 miles northwest of Gainesville, 16-19.III.1977, H. Greenbaum (1 ♀); Paynes Prairie, 18-21.III.1977, G. S. Fairchild (1 ♀).

2. *Janus integer* (Norton, 1861)

DISTRIBUTION: Quebec south to Maryland (Florida), west to Iowa, Washington and Manitoba. **Florida** Records:
Alachua County: Gainesville, mixed hardwoods and pines, 15.IV to 15.V. 1995, 1996, L. Stange (2♂, 3♀).

3. *Hartigia trimaculata* (Say, 1824)

DISTRIBUTION: Atlantic coast from Quebec to Florida, west to Minnesota, Idaho (isolated populations), Iowa, Kansas, Louisiana, and Oklahoma. **Florida Records:** **Alachua County:** Gainesville, Pierce's Homestead, 9.IV.1976, W. Pierce (1♂); 2 miles west of Gainesville, 30.V.1974, H. Davis (2♀); Paynes Prairie, 3-10.V.1996, G. Steck & B. Sutton (1♂, 2♀); Santa Fe River, 3.7 miles north of LaCrosse, 10-17.V.1996, G. Steck & B. Sutton (1♂); **Collier County:** Picayune State Forest, 1.III.1997, C. Porter & L. Stange (1♀); **Highlands County:** Archbold Biological Station, 8.IV.1978, L. Lambert (1♀); **Lake County:** Tavares, 8.III.1929 (♂); **Lee County:** Alva, 28.III.1962, R. Woodruff (1♀); **Liberty County:** Torreya State Park, 1-17.V.1968, H. Weems (1♂); **Volusia County:** DeLand 16.III.1962, C. Roberts (1♀); DeLeon Springs, 14.IV.1960, R. Woodruff (1♀).

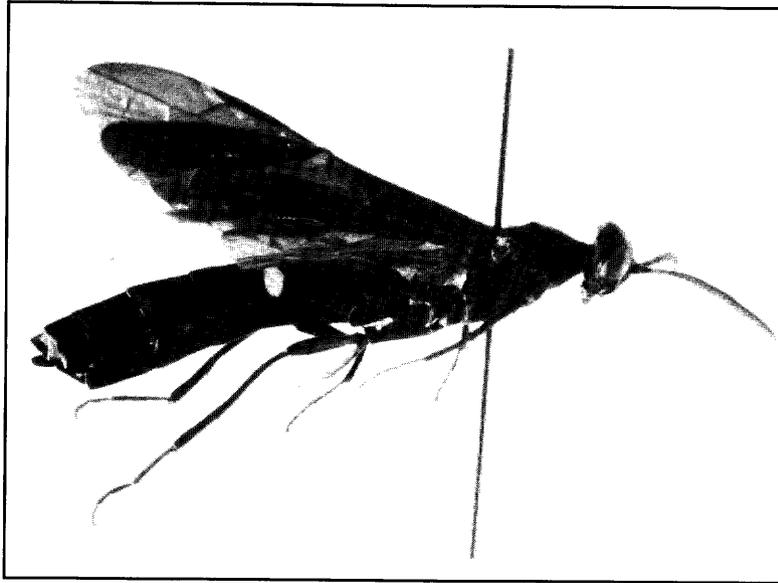


Fig. 3. Male *Hartigia trimaculata*

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